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An Overview of the U.S. Public Health System in the Context of Bioterrorism

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Holly Harvey
Specialist in Social Legislation
Domestic Social Policy Division

Sarah Lister
Specialist in Public Health and Epidemiology
Domestic Social Policy Division

Prepared for Members and Committees of Congress

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An Overview of the U.S. Public Health System in the Context of Bioterrorism

Summary

The anthrax attacks in 2001, along with the events of September 11, have heightened concern about the nation's ability to respond to bioterrorist attacks. The role of public health in bioterrorism preparedness and response is to plan and coordinate emergency medical and public health response capabilities, to detect, investigate and identify disease outbreaks using surveillance systems, epidemiology and laboratory services, to maintain healthy conditions by regulating environmental conditions, food and water safety to minimize disease threats, and to communicate rapidly and clearly with response partners, health practitioners, the media and the public. The capacity to fulfill these responsibilities depends on the strength of the infrastructure that supports the provision of public health services.

The public health infrastructure is the organizations, people and data systems needed to *assure* the provision of essential public health services. Public health organizations exist at the federal, state and local level and interact with each other, the health care delivery system, public safety providers, private enterprises and volunteer organizations to provide public health services. Even before September 11 and the 2001 anthrax attacks, a consensus had emerged among public health experts that the public health system had deteriorated. A series of studies and reports cited outmoded technology and information systems, insufficient resources to combat emerging and drug-resistant diseases, a public health workforce with inadequate training to address new threats or to adapt to new ways of doing things, poor communication among responsible parties, and inadequate capacity in hospitals and laboratories to respond to a mass casualty event as the major challenges facing public health organizations.

Recent congressional action has provided funding and guidance to improve public health capacity at the federal, state and local level. Challenges remain in a variety of areas, including: coordination and communication between public health officials and other participants in public health preparedness and response, upgrading data and information systems capabilities, improving laboratory capacity, increasing emergency medical response capacity, improving the skills and education of the public health workforce, and conducting research to improve bioterrorism prevention, detection and treatment options. Finally, many worry about how to be sure that the increased funding devoted to increasing public health capacity yields results in improved preparedness and response capability. This report will be updated as the public health system evolves and responds to congressional action.

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An Overview of the U.S. Public Health System in the Context of Bioterrorism

Introduction

Bioterrorism poses a unique challenge to the medical care and public health systems. Unlike an explosion, which results in immediate and visible casualties, the public health impact of a biological attack can unfold gradually over time. Until a sufficient number of people arrive at emergency rooms and doctors' offices complaining of similar symptoms, there may be no sign that an attack has taken place. The speed and accuracy with which doctors and laboratories reach the correct diagnoses and report their findings to public health authorities has a direct impact on the number of people who become ill and the number that die. The Nation's ability to respond to a bioterrorist attack, therefore, depends crucially on the state of preparedness of its medical care systems and public health infrastructure.

The public health system plays a central role in orchestrating and coordinating the response to a bioterrorist attack. The anthrax incidents in 2001 focused lawmakers' attention on the U.S. public health system. Lawmakers, along with the rest of the public, turned to public health officials for information about the symptoms of anthrax, the population at risk of exposure, the availability of preventive measures, and appropriate medical treatment. In addition, public health laboratories all over the country tested an unprecedented number of samples of suspected anthrax.

In general, reviews of the response of public health during the anthrax crisis have been mixed. However, it was actually a rather small scale incident and experts worry that had more people or more localities been affected, the public health system would have been overwhelmed. In addition, the anthrax incidents served to highlight potential problems that public health officials have worried about in recent years.[1]

Several reports and evaluations described problems with the public health system prior to the anthrax attacks. Among the problems cited were health department closures, outmoded technology and information systems, a public health workforce with inadequate training to address new threats or to adapt to new ways of doing things, poor communication among responsible parties, and inadequate

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[1] Institute of Medicine (IOM). *The Future of Public Health in the 21st Century.* The National Academy of Science, forthcoming, 2003. (Hereafter cited as IOM Report) Currently available at [http://www.nap.edu/books/0309086221/html/].

capacity in hospitals and laboratories to respond to a mass casualty event.[2] The anthrax attacks demonstrated the seriousness of these problems.

Among the explanations given for the deficiencies of the public health system have been diffusion of responsibility for public health services across multiple government agencies and declining funding for their activities, the reduction in risk of infectious disease through imposition of sound sanitation practices and the development of vaccines in the early twentieth century, the rising importance of effective biomedical interventions to combat disease, and a shift in funding priorities to programs providing medical care to those with no other source of care.[3]

Improving public health preparedness and response capacity is expected to offer protection not only from bioterrorist attacks, but also from naturally occurring public health emergencies. Public health officials are increasingly concerned about our exposure and susceptibility to infectious disease and food-borne illness because of global travel, increased volume of food imports, and the evolution of antibiotic-resistant pathogens. Public health experts argue that a strong infrastructure provides the capacity to prepare for and respond to both acute and chronic threats to the Nation's health, whether they are bioterrorism attacks, emerging infections, disparities in health status, or increases in chronic disease and injury rates.

Primary responsibility for public health rests with the states. However, the federal government plays an active role in public health by providing funding to states and localities, establishing national priorities, providing technical assistance, and coordinating knowledge dissemination.[4] Some have suggested that the threat of bioterrorism has made public health a national security issue and that the federal government should therefore play a stronger role. Others worry that a stronger federal role will reduce flexibility. They emphasize that the first response to any event is local, that localities have differing needs, and that they must have a strong role in resource allocation decisions.

While many in the public health community have welcomed the renewed interest in building a strong public health infrastructure, others worry that the emphasis placed on bioterrorism preparedness provides too narrow a focus to achieve a truly effective public health system that is responsive to all potential health hazards.

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[2] See for example General Accounting Office, *Emerging Infectious Diseases: Consensus on Needed Laboratory Capacity Could Strengthen Surveillance*, GAO/HEHS-99-26, Feb. 1999; Amy E. Smithson, and Leslie-Anne Levy, Ataxia: The Chemical and Biological Terrorism Threat and the U.S. Response, Henry L. Stimson Center, Report no. 35, Oct. 2000; and *Local Public Health Agency Infrastructure: A Chartbook*, National Association of County and City Health Officials, Oct. 2001. (Hereafter cited as NACCHO Chartbook)

[3] Eileen Salinsky, Public Health Emergency Preparedness: Fundamentals of the "System," *National Health Policy Forum Background Paper*, Apr. 3, 2002. (Hereafter cited as Salinsky NHPF Paper)

[4] Bernard J. Turnock, and Christopher Atchison, Governmental Public Health in the United States: The Implications of Federalism, *Health Affairs*, v. 21, no. 6, Nov./Dec. 2002, pp. 68-78.

In addition, the ability to sustain a newly improved infrastructure over time is of concern to many.

As Congress continues to deliberate on how best to prepare for a bioterrorist attack, information about the role of public health and the public health infrastructure becomes increasingly relevant. This report continues with two sections. The first provides an overview of the public health infrastructure. The second discusses the changes and improvement that are underway, and the issues and challenges inherent in improving public health preparedness.

Public Health Infrastructure

The mission of public health, as defined by the Public Health Functions Steering Committee, is to promote physical and mental health and prevent disease, injury and disability.[5] The public health system includes a wide array of governmental and non-governmental entities including:

- over 3000 county and city health departments and local boards of health,
- 59 State and territorial health departments,
- tribal health departments,
- more than 160,000 public and private laboratories,[6]
- parts of multiple Federal departments and agencies,
- hospitals and other health care providers, and
- volunteer organizations such as the Red Cross.

Definitions vary but, in practical terms, the public health infrastructure is federal, state and local public health organizations and the resources they need to operate effectively.[7] These governmental organizations form "the nerve center of the public health system"and interact with a wide array of other partners to assure public health.[8] The public health workforce and data and information systems are key resources. Of course, funding is also necessary to provide resources.

In the context of bioterrorism, some key functions of the public health infrastructure include using disease surveillance systems to detect outbreaks, conducting specialized laboratory tests to identify bioagents, using epidemiologic

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[5] U.S. Department of Health and Human Services (HHS), From *Public Health in America,* Public Health Functions Steering Committee, July 1995.

[6] HHS, Centers for Disease Control and Prevention, *Public Health's Infrastructure: A Status Report,* Prepared for the U.S. Senate Appropriations Committee, Mar. 2001. (Hereafter cited as CDC Infrastructure Status Report)

[7] See Edward L. Baker, and Jeffrey Koplan, Strengthening the Nation's Public Health Infrastructure: Historic Challenge, Unprecedented Opportunity, *Health Affairs*, v. 21, no. 6, Nov./Dec. 2002.

[8] B.J. Turnock, *Public Health — What It Is and How It Works*, 2d.ed. (Gaithersburg, MD: Aspen Publishers, 2001).

methods to identify persons at risk, and using knowledge of disease processes in populations to determine appropriate responses (e.g. need for quarantine or decontamination, dissemination of medical treatment recommendations), and coordinating with other emergency response partners to establish effective response plans.

Legal Framework for Public Health

Public health practice is governed by federal, state, and local law. States have primary responsibility for protecting the public's health. However, the federal government can influence public health practice through its funding decisions and by exercising its jurisdiction over interstate commerce. The power of local governments is largely derived from delegation of state authority. This section will briefly review the roles played by federal, state, and local government in public health.

The federal government exerts a strong influence on public health practice through its ability to tax and spend and its responsibility for regulating interstate commerce. Through its power to regulate interstate commerce, the federal government can act to protect the environment, ensure food and drug safety, and promote occupational health and safety. The power to tax allows the federal government to encourage certain behaviors (e.g. deductibility of employee health insurance costs encourages employers to provide insurance) and to discourage others (e.g. raising the price of smoking through cigarette taxes). The federal government can also set conditions on the expenditure of federal funds. For example, states must set 21 as the minimum age for the legal consumption of alcohol in order to qualify for federal highway funds.

Federal public health statutes are largely contained in the Public Health Service Act, the Federal Food, Drug and Cosmetic Act, the National Environmental Policy Act, the Clean Air Act and other related statutes. In general, the Public Health Service Act authorizes the activities of the public health service agencies and creates important vehicles for federal funding of public health activities in states and communities. The Federal Food, Drug and Cosmetic Act authorizes the Food and Drug Administration (FDA) to directly regulate the safety of food and cosmetics and the safety and effectiveness of pharmaceuticals, biologics, and medical devices. The National Environmental Policy Act and related environmental statutes authorize the Environmental Protection Agency (EPA) to regulate the safety of the air, water, and the ecological system. [9]

Other provisions of the federal code apply under emergency circumstances when federal assistance to states and localities is needed. The Stafford Act establishes provisions for federal assistance to states in the event of a disaster. The act requires the governor of the affected state to request a declaration of a disaster and vests the President with the authority to make such a declaration and charge federal agencies to provide support to state and local efforts.

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[9] Salinsky NHPF Paper.

Federal Public Health Role and Organizations

A recently released report from the Institute of Medicine, *The Future of Public Health in the 21st Century*, identifies six main areas where the federal government plays a role in population health. The six areas are policy making, financing, public health protection, collecting and disseminating information about U.S. health and health care delivery systems, capacity building for population health, and direct management of services.[10]

The Department of Health and Human Services (HHS) bears primary responsibility for most public health activities at the federal level. Other key activities are located in the Department of Homeland Security (DHS), the Environmental Protection Agency (EPA), the Department of Agriculture (USDA), the Department of Defense (DoD), and the Department of Veterans Affairs (VA). However, this paper will focus on federal activities in HHS because it is the locus of funding to improve public health capacity.

Department of Health and Human Services. The newly formed Office of the Assistant Secretary for Public Health Emergency Preparedness within the Office of the Secretary (OS) directs and coordinates the implementation of HHS's bioterrorism programs and activities. Other public health agencies within HHS with responsibilities for bioterrorism preparedness and response include the Centers for Disease Control and Prevention (CDC), the Food and Drug Administration (FDA), the Health Resources and Services Administration (HRSA), the National Institutes of Health (NIH), and the Agency for Healthcare Research and Quality (AHRQ).

Centers for Disease Control and Prevention. The CDC is the center of federal public health activities. The CDC works with states, localities, and other nations to detect, investigate, and prevent the spread of disease, to develop and implement prevention strategies, and to monitor the effect of environmental conditions on health. State and local public health agencies receive support from the CDC in a variety of ways, including financial assistance, training programs, technical assistance and expert consultation, sophisticated laboratory services, research activities, and standards development.[11] One of the key vehicles for support of state and local public health agencies is the state and local preparedness grant program established in 1999 and greatly expanded beginning in FY2002.[12] This program provides funding and guidance to states to assist them in upgrading state and local public health jurisdictions' capacity to prepare for and respond to bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies.

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[10] IOM Report.

[11] Salinsky, NHPF Paper.

[12] An amendment to the FY2002 Defense Department appropriations bill (P.L. 107-117) provided HHS with a total of $2.8 billion for bioterrorism-related activities from emergency supplemental funds in FY 2002.

Health Services and Resources Administration. HRSA administers the state grant program to facilitate regional hospital preparedness planning and to upgrade the capacity of hospitals and other health care facilities to respond to public health emergencies — including the development of multi-tiered systems which enable local health care entities to triage, treat, stabilize and refer multiple casualties to identified centers for treatment. HRSA is also generally responsible for healthcare workforce development — including funding for training in emergency medical and trauma services, as well as funding to improve medical school curricula in the area of bioterrorism recognition.

Food and Drug Administration. The FDA has responsibilities for ensuring the availability of safe and effective drugs, vaccines, blood products, medical devices, radiological products, and animal health products. The FDA also has responsibility for assuring the safety of the food supply and does so in partnership with the Department of Agriculture which is responsible for the safety of meat, poultry and processed egg products. FDA establishes guidance and regulatory requirements for assuring that food is not adulterated and ensures the safety and efficacy of all drugs used in food animals and feeds. The FDA is supported by 3,000 state and local offices responsible for monitoring retail food establishments and their employees.[13]

National Institutes of Health. The NIH conducts and supports biomedical research, including research targeted at the development of rapid tests and new and more effective vaccines and antimicrobial drugs. Within NIH, the National Institute of Allergy and Infectious Diseases (NIAID) bears primary responsibility for bioterrorism-related research. The anthrax attacks of fall 2001 uncovered unmet needs for tests to rapidly diagnose, vaccines and immunotherapies to prevent, and drugs and biologics to cure disease caused by agents of bioterrorism. In February 2002, NIAID announced its strategic research plan which is directed at supporting research needed to understand the pathogenesis of the agents of bioterrorism and the host response to them and to translate that knowledge into useful interventions and effective diagnostic tools for an effective response.[14]

Agency for Health Care Research and Quality. AHRQ sponsors and conducts research designed to improve the quality of health care. In the area of bioterrorism, AHRQ's research focuses particularly on improving the clinical preparedness of health care providers. For example, the agency has studied how best to communicate with physicians and other private health care providers in the event of a public health emergency and has assessed the most effective methods for training physicians about bioterrorist threats.

Department of Homeland Security. The Homeland Security Act (P.L. 107-296) left most public health activities in HHS. The exceptions were the Office of Emergency Preparedness (OEP) and the National Pharmaceutical Stockpile

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[13] A description of FDA's counterterrorism activities can be found at [http://www.fda.gov/oc/opacom/hottopics/bioterrorism.html].

[14] NIAID, *NIAID Strategic Plan for Biodefense Research*, NIH, Feb. 2002 accessed at [http://www.niaid.nih.gov/biodefense/research/strategic.pdf].

(renamed the Strategic National Stockpile (SNS)) which were moved to the Emergency Preparedness and Response Directorate (EPR) of DHS.[15] The EPR's mission is to improve the Nation's capability to reduce losses from all disasters, including terrorist attacks.[16] In addition, P.L. 107-296 directs the Secretary of HHS to collaborate with the Secretary of DHS in setting priorities for human-health related countermeasures research and development and for all public-health related activities to improve state, local, and hospital preparedness and response.

Office of Emergency Preparedness. OEP managed the National Disaster Medical System (NDMS) and the Metropolitan Medical Response System (MMRS) programs within HHS. The NDMS was established to provide medical care and hospitalization in the event a disaster overwhelms local emergency services. It is a partnership of four federal agencies (HHS, DoD, VA, and the Federal Emergency Management Agency (FEMA)), state and local governments and the private sector.[17] The primary focus of the MMRS is to develop or enhance existing emergency preparedness systems in metropolitan areas to manage effectively a large-scale public health emergency. The goal is to coordinate the efforts of local law enforcement, firefighters, hazardous materials cleanup (HAZMAT) teams, EMS, hospital, public health and other personnel to improve response capabilities such as early identification of specific hazards, protection of the public from dangerous exposures, mass patient care and fatality management, and environmental safety. Enhanced metropolitan response systems typically cost about $2.5 million and are jointly funded by HHS and local governments, with funding primarily coming from local governments. Currently, 122 cities are part of the MMRS.[18]

Strategic National Stockpile (SNS). The SNS includes pharmaceuticals, vaccines, and other medical supplies that can be deployed in the event of a bioterrorist attack or any other public health emergency. The stockpile has two components: (1) Push Packages, each consisting of 50 tons of preassembled medical supplies, which can be delivered to any location in the country within 12 hours; and (2) Vendor Managed Inventories packages, which are tailored to provide medical supplies specific to a suspected or confirmed biological or chemical agent.[19] Although the Homeland Security Act transferred the SNS to DHS, day to day management of stockpile operations is handled by CDC via a memorandum of understanding between DHS and HHS.

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[15] OEP and the Strategic National Stockpile were transferred to DHS on Mar. 1, 2003.

[16] For a summary of EPR's mission and components, see CRS Report RS21367, *Emergency Preparedness and Response Directorate in the Department of Homeland Security* by Keith Bea, William Krouse, Daniel Morgan, Wayne Morrissey, and C. Stephen Redhead.

[17] For more information on the NDMS, go to [http://ndms.dhhs.gov].

[18] For more information on the MMRS program, go to [http://mmrs.fema.gov].

[19] For more information, go to [http://www.bt.cdc.gov/stockpile/index.asp].

State Public Health Role and Organizations

States have considerable autonomy in delivering public health services. Authorities for professional licensing, domestic isolation and quarantine, contact tracing, and mandatory disease reporting are based largely in state statute and regulation.[20] The Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction (commonly known as the Gilmore Commission),[21] notes that for this reason, "the nation's health and medical preparedness cannot rely heavily on the federal government."[22] Historically, CDC has funded state public health programs through *cooperative agreements,* in which both parties (and ideally local jurisdictions and other stakeholders as well) are involved in setting goals and defining priorities.

Many states deliver public health services through multiple state agencies. Thirty-five states have free-standing state health agencies, while in other states public health is part of a larger agency that is responsible for a wide range of activities (for example, human services).[23] Important aspects of public health, such as environmental health and emergency medical services (EMS), may be housed outside the state's primary public health agency. In 36 states, the environmental health agency is separate from the state health agency. Emergency medical services are commonly found in the public safety department or governed by a separate EMS authority or board when they are not housed in the state public health agency.

States differ in the amount of authority they delegate to local governments. Some states provide local governments with very little authority, while others offer local jurisdictions "home rule" over public health matters. Delegation of public health authority can be classified into three categories: (1) a centralized approach in which states have extensive legal and operational control over local authorities, (2) a decentralized approach in which local governments are delegated significant control, and (3) a hybrid approach in which some public health responsibilities are provided directly by the state, while others are assumed by the localities. **Table 1** shows the distribution of states by category.

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[20] Lawrence O. Gostin, et. al., "The Model State Emergency Health Powers Act: Planning for and Response to Bioterrorism and Naturally Occurring Infectious Diseases," *JAMA,* vol. 288: pp. 622-628, 2002.

[21] Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction, *Fourth Annual Report to the President and Congress,* Dec. 2002, available at [http://www.rand.org/nsrd/terrpanel/terror4.pdf]. The panel, commonly known as the Gilmore Commission after its chair, former Virginia Governor James S. Gilmore III, was established by Section 1405 of the National Defense Authorization Act for FY1999, P.L. 105-261.

[22] Ibid, p. 51.

[23] Salinsky NHPF Paper.

Table 1. Distribution of States by Delegation of Public Health Authority to Localities

Centralized	AR, DE*,FL, HI*, LA, MS, NM, RI*, SC, VA, VT*
Decentralized	AZ, CO, CT, ID, IN, IA, ME, MO, MT, NE, NV, NJ, ND, OR, UT. WA, WI
Hybrid	AL, AK, CA, GA, IL, KA, KY, MD, MA, MI, MN, NH, NC, NY, OH, OK, PA, SD, TN, TX, WV, WY

Source: Salinsky NHPF Paper.

* State-run systems that do not classify their field offices as local health departments.

Both the location of public health activities within state government and the extent of delegation to localities may be important factors in determining the speed with which state and local public health are able to adapt to new priorities. These factors can have a large effect on the speed with which new guidance from the federal government is incorporated into agency budgets and passed through to localities. For example, if a general state hiring freeze is in effect, the proximity of the state public health officer to the state's governor can make a big difference in how soon an exemption for hiring specialized staff for bioterrorism preparedness gets considered.

States also differ in how long they have focused on bioterrorism. A number of states received funding under CDC's Bioterrorism Initiative beginning in 1999 for a variety of different capacity building activities. While state governments vary in both the breadth and depth of services they cover and the degree to which they delegate to local governments, they, nevertheless, tend to play certain key roles in public health emergency preparedness and response. Except in the largest metropolitan public health departments, local health officials will generally turn to state assets for providing advanced laboratory capability and epidemiologic expertise and serving as a conduit for federal assistance.

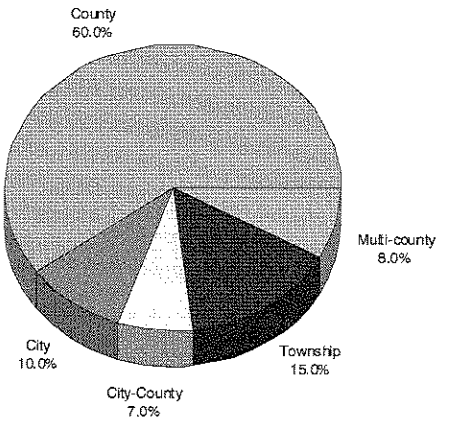
Local Public Health Role and Organizations

The role and organization of local public health varies tremendously across the United States. However, in general local health departments are in the front line in responding to public health emergencies. The diversity in local public health organizations (LPHAs) can be illustrated with a few statistics from a recent survey of local public health infrastructure conducted by the National Association of County and City Health Officers (NACCHO).[24] This variation may have important implications for considering how best to improve public health preparedness.

[24] NACCHO Chartbook.

Figure 1 shows the distribution of local public health agencies (LPHAs) by type of jurisdiction. The most common arrangement is a LPHA serving a single county, but 40% of LPHAs serve other types of jurisdictions. County LPHAS range in size from small rural counties to large metropolitan ones such as Los Angeles County. County LPHAs may or may not serve all geographic areas within the county — for example, a city within a county may be served by its own municipal LPHA. City public health agencies may serve small cities or large urban areas such as Kansas City, MO, or New York City. In some cases, a city and its surrounding county join together to form one city-county LPHA. Township health departments are usually located in states with strong "home-rule" or "town-meeting" political systems such as Connecticut, Massachusetts, and New Jersey. Finally, multi-county health departments serve more than one county and often span large geographic areas in the western United States. Multi-county LPHAs also include regional or district LPHAs whose health directors may report to multiple county boards of health.

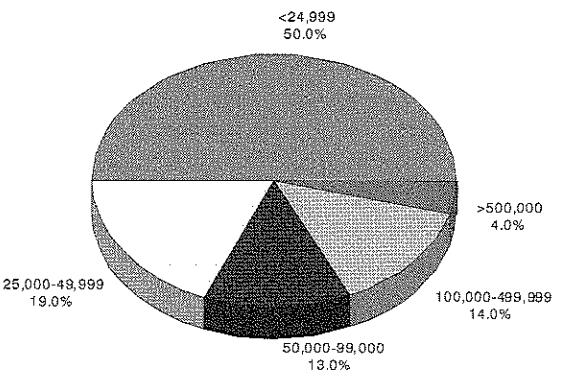
Figure 1. LPHAs by Type of Jurisdiction



Source: NACCHO Chartbook. October, 2001

Figure 2 shows the distribution of LPHAs by population served. Over two-thirds of LPHAs serve jurisdictions with fewer than 50,000 people. In contrast, 4% of LPHAs serve jurisdictions with populations of 500,000 or more. Not surprisingly, the number of workers employed by LHPAs also varies tremendously.

Figure 2. LPHAs by Population Served



Source: NACCHO Chartbook. October, 2001.

Table 2 shows both the average and median number of full-time equivalent (FTE)staff for metropolitan and nonmetropolitan LPHAs. The mean, or average, staff of a metropolitan LPHA is 108 FTEs. However, half of metropolitan LPHAs have 28 or fewer FTEs. In nonmetropolitan areas, the average number of FTEs is 31, but half of the LPHAs have 13 or fewer FTEs. Administrative and clerical staff, environmental health specialists and public health nurses are the occupational categories most commonly used by LPHAs to describe the staff they employ. The

training and education of workers in these positions varies tremendously and occupational titles do not always reflect professional public health training or degrees in a particular discipline.

Table 2. Full-time Equivalent (FTE) Staff at LPHAs

	Metro LPHAs	Non-metro LPHAs
Mean FTEs	108	31
Median FTEs	28	13

Source: NACCHO Chartbook.

The scope of services that LPHAs are responsible for also varies. In some areas, LPHAs run county hospitals, while in others, the LPHA is only responsible for septic systems and restaurant inspections. The most common bioterrorism-related programs and services provided by LPHAs include epidemiology and surveillance, communicable disease control measures, food safety, and restaurant inspections. The NACCHO survey shows that over 70% of LPHAs provide: adult and child immunizations, tuberculosis testing, community assessment, community outreach and education, environmental health services, and health education.

Public Health Laboratories

Public health laboratories are a special sub component of federal, state, and local public health organizations. Laboratories are a critical component of early detection. Identification of a specific pathogen often requires specific testing protocols using specific reagents and sometimes specialized equipment. In addition, special safety procedures (such as working under an exhaust hood) must be used with certain pathogens — particularly those in aerosol form. Most clinical laboratories are not set up to identify the pathogens likely to be used in a bioterrorist attack.

CDC, in cooperation with the Association of Public Health Laboratories and the FBI, has established a multi-level Laboratory Response Network (LRN) which includes local, state and federal laboratories and facilitates sample collection, transport, testing, planning for the capacity to handle a sudden large increase in samples, and training for laboratory readiness to identify CDC-designated critical biological agents.[25] Currently, all 50 state public health laboratories serve as reference laboratories in the LRN. Membership in the LRN gives laboratories access to standard protocols for testing and for sample preparation and care that preserves the chain of custody and maintains a sample's viability for later testing.

Clinical and public health laboratories in the LRN are identified by increasing levels of sophistication. A lab's designation depends on the biosafety level of its

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[25] Centers for Disease Control and Prevention, *Facts About the Laboratory Response Network*, fact sheet, Feb. 4, 2004, at [http://www.bt.cdc.gov/lrn/factsheet.asp].

physical facilities and its ability to perform certain types of tests.[26] Originally, the LRN categorized labs as Level A, B, C, or D with Level D labs representing the highest biosafety level and proficiency. As the LRN has matured, this categorization has been revised to more closely reflect a lab's function within the LRN. *Sentinel* labs are on the front line and can perform tests to rule out suspected biologic agents. If a sentinel lab is unable to rule out a suspected agent, the sample is referred to a *reference* lab which can perform *confirmatory*, or definitive, tests. Finally, *national* labs perform definitive characterization of an agent once it has been identified by a reference lab. Current LRN national labs are at the CDC and the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) at Fort Detrick in Maryland.

Public Health Workforce

Recent attempts to enumerate the public health workforce yield estimates of roughly 450,000 employed workers deployed approximately evenly at the local, state, and national levels.[27] The public health workforce encompasses a wide range of professional disciplines and occupations. Some of the most common are physicians, nurses, environmental specialists, laboratorians, health educators, disease investigators, outreach workers and managers. Professional public health training includes studies in biologic sciences, epidemiology, biostatistics, environmental health science, and health services administration. Estimates from a 1989 HRSA study show that only 44% of public health workers had formal, academic training in public health.[28] As of 1997, 78% of local health department executives did not have graduate degrees in public health.[29]

Data and Information Systems

Data and information systems are important components of the public health infrastructure because of the need to manage and analyze large amounts of information and the need to communicate quickly and accurately with a wide range of other entities. Data and information systems encompass disease surveillance systems, epidemiological analysis and communication systems. These systems are currently a hodgepodge of paper, telephone and computer-based systems. For example, only half of state, local and territorial health departments had full internet connectivity on October 4, 2001, when the first anthrax case was reported. Another

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[26] Biosafety levels describe the combinations of standard and special laboratory practices, safety equipment, and facilities recommended for work with a variety of infectious agents in various laboratory settings. There are four biosafety levels described by CDC in the May 1999 ed. of *Biosafety in Microbiological and Biomedical Laboratories*, 4th ed.,GPO, Washington, 1999.

[27] HHS, Health Resources and Services Administration, Bureau of Health Professions, *The Public Health Workforce: Enumeration 2000*, Dec. 2000. Available at [http://bhpr.hrsa.gov/healthworkforce/reports/default.htm].

[28] CDC Infrastructure Status Report.

[29] Ibid.

20% lacked e-mail capacity and so were unable to receive electronic updates regarding the anthrax events.[30]

CDC, is leading an effort called the Public Health Information Network (PHIN) to enable the exchange of key health data throughout all levels of public health and the health care industry through development of shared standards.[31] The PHIN is being built on technical standards and infrastructure established through other CDC initiatives discussed below.

Health Alert Network (HAN). The Health Alert Network (HAN) is a nationwide, integrated information and communications system serving as a platform for distribution of health alerts, dissemination of prevention guidelines and other information, distance learning, national disease surveillance, and electronic laboratory reporting. The HAN program is managed by CDC and is also designed to provide resources for building information technology capacity within local public health departments. Currently, all 50 states, the District of Columbia, eight territories, two-thirds of U.S. counties and major hospital networks and health organizations are connected to HAN. The information technology capacity improvements generated through the HAN program allow states and localities to improve communication with CDC and each other for a range of activities.[32]

National Electronic Disease Surveillance System (NEDSS). The goal of NEDSS is to have integrated surveillance systems that can transfer appropriate public health, laboratory, and clinical data efficiently and securely over the internet.[33] To accomplish this goal, NEDSS promotes the use of data and information standards which are necessary for the development of efficient, integrated and interoperable surveillance systems at federal, state and local levels.[34]

Epidemic Information Exchange (Epi-X). The Epi-X system allows secure, Web-based communications among federal, state and local epidemiologists, laboratories and other members of the public health community. It also provides the capacity for instant notification about urgent public health events and a searchable database with information on outbreaks and unusual health events.[35]

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[30] IOM Report, p. 136.

[31] For more information the PHIN, go to [http://www.cdc.gov/programs/research8.htm].

[32] For more information on the HAN network, see [http://www.bt.cdc.gov/documentsapp/HAN/han.asp].

[33] John R. Lumpkin and Margaret S. Richards, Transforming the Public Health Information Infrastructure, *Health Affairs*, v. 21, no. 6, Nov./Dec. 2002. (Hereafter cited as Lumpkin *Health Affairs* article)

[34] For more information on NEDSS, go to: [http://www.cdc.gov/nedss/index.htm].

[35] IOM Report.

Funding

Funding for public health comes from a variety of sources including local, state and federal government programs, grants from foundations, reimbursements from insurance companies, and patient and regulatory fees. As noted above, huge differences exist in the scope of activities, size of population served and organization of the governmental public health infrastructure at the state and local levels. Differences in defining public health activities and in accounting practices make it difficult to gather systematic and comparable national information on public health expenditures from all sources. One specific difficulty involves counting all expenditures related to a common set of public health activities (for example, environmental health) regardless of where they are in the governmental structure. Another particularly difficult problem is separating expenditures and receipts for direct medical care services to individuals from those for general population-based services.

Given the difficulty of measuring public health expenditures, it is not surprising that estimates from different sources yield different results. Recently published estimates based on National Health Account (NHA) data show total federal, state and local public health expenditures of $17.1 billion for 2000.[36] Federal spending accounted for 28% of the total with state and local spending making up the remaining 72%. In these estimates, NHA data were adjusted in an attempt to include only funding for population-based services. In contrast, estimates from a state-sponsored survey of nine states done in the early 1990's showed that 50% of spending for population-based public health activities came from states, while 32% came from federal sources and 18% came from local sources.[37]

A separate analysis of local health agency funding sources shows that, on average, 44% of LPHA funding came from local sources while 30% came from state sources including pass-throughs of federal funding. An additional 3% of funding came directly from the federal government to LPHAs and 19% came from fees or service reimbursement.[38] Metropolitan LPHAs tend to receive a larger share of funding from local sources than non-metropolitan LPHAs.

HHS has provided support to a collaborative effort among state and local public health associations to explore methods to measure actual public health expenditures at the state and local level. Initial feasibility studies show some promise, but no systematic accounting is currently conducted on a regular basis.[39]

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[36] Senator Bill Frist, Public Health and National Security: The Critical Role of Increased Federal Support, *Health Affairs*, v. 21, no. 6, Nov./Dec. 2002.

[37] Public Health Foundation. *Measuring Expenditures for Essential Public Health Services.* Nov. 1996. Accessed at [http://www.phf.org/Reports/Expend1/exec_summ.htm]

[38] NACCHO Chartbook.

[39] IOM Report.

Public Health Partners

Many entities beyond the governmental public health infrastructure play important roles in protecting the public's health. Physicians and other clinical care practitioners and hospitals are two key partners. During routine times, private-sector physicians and other providers can support the public health system by reporting occurrences of certain diseases, by implementing public health recommendations for preventive treatment and patient education and by participating in emergency planning exercises. In a public health emergency, much of any needed medical treatment will be provided by private-sector physicians and other providers subject to the overall coordination of public health officials. Hospitals have disease reporting and public education responsibilities and also provide emergency medical treatment capacity in the event of a public health emergency involving mass casualties.

Recent Congressional Action

Recent Congressional action has provided a framework and funding for strengthening the public health infrastructure at the federal, state and local level and has provided funding for those activities. P.L. 107-188, the Public Health Security and Bioterrorism Preparedness and Response Act, passed in June, 2002 and provides a five-year authorization for activities designed to bolster the nation's ability to respond effectively to bioterrorist threats and other public health emergencies. The Act authorizes a total of $2.4 billion in FY2002, $2.0 billion for FY2003 and such sums as may be necessary for the remaining years. The Act establishes specific statutory authorities for many of the bioterrorism-related activities already underway under the broader authorities granted in P.L. 106-505, the Public Health Improvement Act. In addition, P.L. 107-188 requires the Secretary of HHS to register facilities and individuals in possession of biological agents and toxins that pose a severe threat to public health and safety, and to promulgate new safety and security requirements for such facilities and individuals.

P.L. 107-188 also contains several provisions to protect the nation's food and drug supply and enhance agricultural security. It authorizes funds for USDA and FDA to hire new border inspectors, develop new methods of detecting contaminated foods, work with state food safety regulators, and protect crops and livestock. It also enhances FDA's ability to inspect and detain suspicious imported food. Finally, it authorizes the provision of financial assistance to community water systems to conduct vulnerability assessments and prepare response plans.[40]

Congressional appropriations for FY2003 and FY2004 have generally maintained the funding levels established in FY2002. **Table 3** shows federal bioterrorism funding in HHS for FY2003, FY2004 and proposed levels for FY2005.

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[40] For a complete summary of P.L. 107-188, see CRS Report RL31263.

Table 3. HHS Bioterrorism Funding

($ millions)

Agency and program	2003 enacted	2004 enacted	2005 request
Centers for Disease Control and Prevention (CDC)			
State and local public health preparedness	1,039[a]	934	829
Bio-Surveillance Initiative	0	0	130
CDC capacity	157	157	142
Anthrax Vaccine Research	18	18	8
CDC Physical Security and Facilities	20	0	0
Independent Studies	2	2	0
Subtotal, CDC	**$1,236**	**$1111**	**$1,109**
Health Resources and Services Admin. (HRSA)			
Hospital preparedness and infrastructure	514	515	476
Medical Curriculum Incentives	28	28	28
Smallpox Compensation Program	42	0	0
Subtotal, HRSA	**$584**	**$543**	**$504**
Food and Drug Administration (FDA)			
Food safety	97	116	181
Vaccines/Drugs/Diagnostics	53	53	58
Physical security	7	7	7
Subtotal, FDA	**$157**	**$176**	**$246**
National Institutes of Health			
Research	687	1,428	1,499
Nuclear/Radiological Countermeasures	0	0	47
Anthrax vaccine	123	117	0
Smallpox vaccine	0	75	45
Intramural physical security and facilities	370	0	0
Extramural physical security	373	0	150
Subtotal, NIH	**$1,553**	**$1,545**	**$1,696**

Agency and program	2003 enacted	2004 enacted	2005 request
Office of the Secretary (OS)			
Office of the Assistant Secretary for Public Health Emergency Preparedness	42	42	42
Other [d]	20	20	20
Subtotal, OS	**$62**	**$62**	**$62**
Agency for Healthcare Research and Quality	5	0	0
Total, HHS Bioterrorism [e]	**$3,597**	**$3,437**	**$3,617**

Source: HHS Budget in Brief, Feb. 2004.

Note: Columns may not add due to rounding.

[a] Includes $100 million for the smallpox vaccination program from the FY2003 supplemental.

Strengthening Public Health Infrastructure

This section will discuss key aspects of the Nation's public health infrastructure targeted for funding by the Congress, the capacity improvements they are intended to produce, and the challenges to making needed improvements. P.L. 107-188 calls for the Secretary of HHS to develop and implement a coordinated strategy for national public health preparedness, to include provision of "specific benchmarks and outcome measures." In writing guidance for grantees for FY2002 and FY2003 funds, HHS, CDC and HRSA laid out required activities, called *Critical Benchmarks,* intended to balance state autonomy and disparate levels of preparedness with an obligation to assure responsible use of federal resources and adequate preparedness nationwide.[41] Benchmarks were grouped by type of activity, such as epidemiology, or communications and information technology, called Focus Areas in CDC guidance, and Priority Areas in HRSA guidance. In addition, a series of Cross-Cutting Benchmarks required certain activities that were to be coordinated across both funding programs, including Incident Management planning, formation of a joint advisory committee to oversee the CDC and HRSA cooperative agreements, and other activities. Guidance from both agencies included additional recommendations and supporting material, providing voluntary planning options for states that had met the required activities. The attached appendix lists Critical Benchmarks for each program in CDC and HRSA guidance for FY2002 and FY2003. Many of the benchmarks refer to analyses, assessments and plans to be conducted or prepared by grantees. Few of them, notably in guidance for laboratory preparedness

[41] See CDC, "Continuation Guidance for Cooperative Agreement on Public Health Preparedness and Response for Bioterrorism — Budget Year Four," May 2, 2003, at [http://www.bt.cdc.gov/planning/continuationguidance/index.asp] and HRSA, "National Bioterrorism Hospital Preparedness Program Cooperative Agreement Guidance," May 2, 2003, at [http://www.tdh.state.tx.us/cphpr/hrsagide.doc].

and information technology, quantify specific needs such as types of equipment or training of personnel.

State and Local Preparedness

The largest single increase in funding for bioterrorism-related activities in FY2002 is the state and local capacity building grant program managed by CDC. Funding for capacity improvements was allocated to states, territories and several major metropolitan areas largely on the basis of population for FY2002 and FY2003. The funding is directed at improving capacity in six focus areas: preparedness planning and readiness assessment, surveillance and epidemiology, laboratory capacity for biologic agents, Health Alert Network/communications and information technology, risk communication and health information dissemination, and education and training.

In January, 2004, CDC presented a review of state compliance with FY2002 *Critical Benchmarks* (as of August 2003), finding that almost all states had completed initial planning for all 14 benchmarks, and were on their way toward achieving the goals set for FY2003 funds as well.[42]

The FY2003 guidance follows the same general framework as the FY2002 guidance, but has some differences that reflect both the natural progression in an ongoing program and experience gained over the past year. While the FY2002 guidance focused mainly on planning, the FY2003 guidance places greater emphasis on activities that will demonstrate improved preparedness. The main differences include: the addition of funding availability for increasing laboratory capacity for chemical agents; more specific guidance on smallpox preparedness activities; and explicit recommendations and requirements that planning activities address mental health needs associated with terrorist attacks. The FY 2003 guidance also requires that states document that a significant portion of local public health officials concur with the proposed use of funds.

CDC is reported to be developing a new system to measure the progress of state and local jurisdictions, employing a new set of *indicators* and a using a contractor to conduct site visits and evaluate states.[43] Referring to the initiative, called the Public Health Preparedness Project, CDC reports that low-scoring states will not have funds withheld, but that the indicators will instead be used to identify gaps, and determine technical assistance needs of states. The evaluations are reported to begin in February 2004. In addition, CDC announced it will pilot some readiness exercises or drills in a small number of states. Results of the site visits and exercises will be used to draft the grants guidance for FY2004 funds. (According to CDC, guidance

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[42] CDC, *State and Local Preparedness — Progress in Achieving Critical Benchmarks*, presented by Joseph M. Henderson at the meeting of the HHS Secretary's Council on Public Health Emergency Preparedness, Jan. 22, 2004, at [http://www.dhhs.gov/asphep/presentation/040122presentationlist.html].

[43] See Jonathan Radow, "CDC Develops Bioterror Scenarios to Evaluate Preparedness Indicators", *WashingtonFax*, Nov. 19, 2003, and Medical Letter on the CDC and FDA, *Preparedness; U.S. Plans to Grade States' Bioterrorism Plans*, Dec. 7, 2003.

is expected in May 2004.) Representatives of state and local health departments are reported to have expressed concerns to CDC about the indicators, specifically whether they will provide an accurate measure of state preparedness. CDC has not made the proposed indicators publically available.

Hospital Preparedness

In addition to the CDC grants for state and local preparedness, additional funds have been directed to states, territories and three major metropolitan areas through HRSA to improve hospital preparedness. In contrast to the CDC program, FY2002 was the first year of the hospital preparedness program. Funding for the first year was $135 million and the FY2003 and FY2004 appropriation increased funding to about $515 million per year. The grants are for the development and implementation of regional plans to improve the capacity of hospitals, their emergency departments, outpatient centers, EMS systems, and other collaborating entities for responding to incidents requiring mass immunization, treatment, isolation and quarantine in the aftermath of bioterrorism or other outbreaks of infectious disease.

The FY 2003 HRSA guidance was announced May 2, 2003 is more extensive than the FY 2002 guidance, reflecting both the increased funding levels for 2003 and experience gained over the past year. The 2003 guidance sets sixteen critical benchmarks across six priority areas. The priority areas are: administration, regional surge capacity, emergency medical services, linkages to public health departments, education and preparedness training, and terrorism preparedness activities. The guidance also emphasizes HRSA's intent that most of the funding awarded to state health departments must be allocated to hospitals, emergency medical systems, and other health care entities.

In January, 2004, HRSA reported progress toward achieving Critical Benchmarks in the hospital preparedness program.[44] Like CDC, HRSA also announced plans to develop a set of indicators to evaluate awardees in the future, to be piloted in the winter and spring of 2004 and used to develop guidance for FY2004 funds, expected in April 2004. The indicators are intended to be quantitative and reflect key aspects of performance. Examples given included bed capacity and capacity to decontaminate victims within a six-hour period.

Strategic National Stockpile

The Strategic National Stockpile (formerly the National Pharmaceutical Stockpile) was created to ensure the availability of the life-saving pharmaceuticals, antidotes and other medical supplies and equipment necessary to counter the effects of nerve agents, biological pathogens and chemical agents. The SNS is meant to augment state and local resources during an attack or other emergency. Funds for the SNS are used to purchase, store and rotate supplies, to assist states and localities in

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[44] HRSA, *National Bioterrorism Hospital Preparedness Program: Progress Toward Achieving Critical Benchmarks*, presented by Rick Smith at the meeting of the HHS Secretary's Council on Public Health Emergency Preparedness, Jan. 22, 2004, at [http://www.dhhs.gov/asphep/presentation/RickSmith.pdf].

developing plans for deployment and for providing training and simulation exercises for state and local officials in the use and distribution of deployed resources.[45]

In its FY2005 budget proposal, the Administration proposes to transfer funding for the SNS from the Department of Homeland Security to HHS, to take advantage of its medical and scientific expertise and its established relationship with state and local health agencies.

Research

Research to develop new drugs and vaccines, increase understanding of how organisms cause disease, how the immune system responds to disease, improve diagnostics for human samples, and to improve environmental detection capability is also an important component of preparing for a bioterrorist attack. Research activities related to bioterrorism are spread throughout the federal government and occur at the state and local level as well. Within HHS, the main entities conducting bioterrorism-related research are NIH, CDC, and FDA. Within NIH, much of the bioterrorism-related research is housed in the National Institute of Allergy and Infectious Diseases (NIAID). The NIAID has recently published a strategic plan that sets priorities for counter-terrorism research. The strategic plan lists six areas of research emphasis including the biology of the microbe, host response, vaccines, therapeutics, diagnostics and research infrastructure improvements. At the CDC, research efforts are directed toward supporting public health infrastructure capacity improvements. FDA bears responsibility for food safety and for regulating the safety and efficacy of new vaccines, antibiotics, other countermeasures and diagnostic devices. FDA's research activities provide the scientific basis for their regulatory decisions and the tools needed to identify and assess risks.

Challenges to Improving Public Health Infrastructure

While recent Congressional action has provided significant funding increases for bioterrorism preparedness and response, challenges to achieving improvements remain in several areas. As Congress assesses the effectiveness of initial funding increases and considers future funding levels, information about how these challenges are being addressed by different components of the public health system may be of interest. These are discussed below.

Defining Preparedness

The term "bioterrorism" is often used as a catch-all for a variety of public health threats and emergencies, including mass casualties, chemical terrorism, and infectious diseases that are naturally-occurring. P.L. 107-188, Section 131, requires that preparedness be prioritized first to "bioterrorism or acute outbreaks of infectious diseases," and then to"other public health threats and emergencies." The broad

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[45] For more information on the SNS, go to [http://www.bt.cdc.gov/stockpile/index.asp].

nature of these threats require breadth and depth of preparedness across many jurisdictions. One challenge in increasing preparedness is establishing what minimum level of capacity must exist in every locality and what capacity should be created on a more consolidated basis at a state, regional or federal level.

While a number of assessment tools have been developed to assist states and localities in defining their needs, there are no systemwide standards for public health preparedness at the local, state or federal level. This makes measuring progress and defining base funding needs difficult. Recent efforts by CDC and HRSA to develop indicators that more aptly reflect performance are aimed at addressing this concern.

Coordination and Communication

The many parties involved in preparing for and responding to a bioterrorist attack generate an almost overwhelming coordination and communication challenge. In addition to sheer numbers, the need to coordinate activities and plans among groups who previously had limited, if any interaction with each other poses a significant challenge. At the most basic level, all parties involved in responding to a public health emergency must be able to communicate easily with each other. Development of compatible or interoperable communications for use by all responders has been proposed by many, but developing standards for communications equipment across users with differing needs may be problematic.

Emergency Management. Standards for emergency response call for clear lines of authority and clarity with regard to all participants' roles and responsibilities. However, a recent study by the GAO documents the fragmentation of responsibilities across federal agencies.[46] In addition, some have expressed concern over coordination of federal and state authorities and responsibilities, particularly as they relate to quarantine decisions and restrictions on travel and transportation across state borders. Similar issues can arise between states, especially where major metropolitan areas cross state boundaries. Coordination between states and localities can also be problematic, especially in major metropolitan areas with strong local public health infrastructure.[47] Coordination and communication between public health officials and private-sector health care providers is also a major concern. The recent anthrax attack established that public health officials' ability to communicate quickly and effectively with private-sector physicians is severely limited.

Medical Care vs. Public Health Providers. One of the challenges in this area is the need to bridge the gap between public health practice and medical practice that developed during the 20th century. As biomedical advances greatly increased physicians' ability to treat disease, medicine and public health developed as distinct professional fields with very different cultures and limited understanding and acceptance of each other's approach to protecting public health. This gap creates

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[46] GAO, *Bioterrorism: Public Health and Medical Preparedness*, GAO-02-141T, Oct. 2001.

[47] Eileen Salinsky, Will the Nation Be Ready for the Next Bioterrorism Attack? Mending the Gaps in the Public Health Infrastructure. *National Health Policy Forum Issue Brief No. 776*, National Health Policy Forum, June 12, 2002.

challenges in improving public health preparedness because of physicians' uneasiness about depending on public health professionals for medical treatment protocols.

Communication between public health officials and hospitals is problematic for similar reasons. In addition, the competitive nature of the hospital component of the health care delivery system makes cooperation among hospitals to pool resources and develop emergency response plans problematic. For example, one task hospitals undertake to plan for surge capacity in a public health emergency is to develop lists of where they can get additional supplies such as linens. If hospitals do not share this information with each other, then it would be possible for multiple hospitals to be depending on the same supplier for excess supply in an emergency. On the other hand, hospitals prefer not to share information about suppliers with their competitors because it can put them at a competitive disadvantage.

Food Safety. Concerns also remain about the effectiveness of the current fragmented food safety system in preventing introduction of food-borne pathogens. Specific concerns include the division of responsibility between FDA and USDA, inadequate inspection and enforcement resources (especially in FDA), and the inability to order food recalls (the current system depends on manufacturers to do so on a voluntary basis).[48]

Public Information. Clear and credible communication with the public is believed to be essential for minimizing panic and providing necessary substantive information. Experts have noted that public health agencies does not have adequate plans, resources, or trained personnel to properly communicate risks and recommendations to the public during health emergencies. A survey of state health officials found progress in communications training and exercises, and in the development of basic communications plans and contingency plans for electrical outages, but notes that challenges remain in addressing language and cultural barriers, reaching those in rural areas, and finding capable public information staff.[49]

Information systems

Inadequate information and telecommunications capacities have been cited as major weaknesses in the current public health infrastructure. Improvements in this area could help meet many of the communication challenges cited above. As described previously, CDC has established the Health Alert Network (HAN) to enhance state and local computer and information technology capacity. The ultimate goal of this program includes an Internet backbone, hardware, secure websites, curriculum, distance learning, and media programs. However, some worry that the basic needs in some states and localities are so great that much of the initial investment will be needed just to purchase the necessary computer equipment.

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[48] For more information on food safety issues, see CRS Report RL31853.

[49] Association of State and Territorial Health Officials, *Public Health Preparedness: A Progress Report — The First Six Months, a report of the Bioterrorism Accountability Indicators Project (BTAIP)*, July 2003, pp. 69-73, at [http://www.astho.org/docs/BTAIP_Survey_Results.pdf].

Experts have also called for development of widely accepted data standards and expanded use of electronic, Web-based disease reporting from physicians and laboratories to improve reporting compliance and timeliness.[50]

Laboratory capacity

The anthrax attacks highlighted the need to improve public health laboratory capacity and technological capabilities. Experts have called for accelerated development and dissemination of rapid diagnostic and detection tests. Concerns have also been raised about physical security at laboratory facilities that store and process hazardous microbes and chemicals. P.L. 107-188 required new security measures under the Select Agent program, measures which became fully effective in November 2003.

Research

While government funding for research on countermeasures to bioagents has increased, concerns exist about the likelihood of significant investment by the pharmaceutical industry in the development of antibiotics and vaccines. The commercial market for these products and other countermeasures has been viewed as modest and concerns over liability have further reduced industry interest. Congress has grappled with this problem for several years and in FY2004 the President's budget proposed Project BioShield to encourage companies to produce new countermeasures by guaranteeing a market for these products. Congress is currently considering three BioShield bills (S. 15, S. 1504, and H.R. 2122).[51]

Emergency Medical Preparedness and Response

In addition to the coordination and communication challenges cited above, concern has been raised over the significant resource needs of health care facilities to respond to bioterrorism relative to the amount of funding committed for these purposes thus far. Some have suggested that it may be possible to reduce the resources required by pooling resources across regions and making strategic investment decisions.

Public health workforce

In order to provide the public health services necessary for responding to the bioterrorist threat, the public health system must have an adequate supply of people with the skills and training needed to perform certain key functions. Among these functions are: forming effective partnerships with other parts of the response community to develop and implement public health preparedness plans, detecting disease outbreaks through surveillance, epidemiology and laboratory testing, and

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[50] Lumpkin *Health Affairs* article.

[51] For a discussion of the Project BioShield legislation, see CRS Report RS21507, *Project BioShield*, by Frank Gottron.

communicating health risks and preventive measures to the public, health care providers, and key decision makers.

Even before the 2001 anthrax attacks, the gap between the skills and education needed to provide public health services and those that exist in the current public health workforce were of concern to many in the public health community. Salaries are generally low for people working in public health which has made it hard to attract and retain an adequate workforce. The average tenure of a state health department chief executive is two years.[52]

Workforce development issues encompass both concerns about the availability of enough skilled workers to fill the current needs of public health departments, the adequacy of the supply in the educational pipeline, the adequacy of public health and medical curricula and the ability to train current workers to provide needed skills.[53] In its 2003 report, *Major Management Challenges and Program Risks: Department of Health and Human Services*, GAO notes:

> Increasing staffing of public health departments and laboratories is a top priority for enhancing preparedness in many areas. Officials told us that they did not have enough trained epidemiologists, laboratory technicians, and other professionals to respond to the anthrax incidents while meeting normal, day-to-day responsibilities ... .[54]

In addition, state and local health departments have expressed concern over hiring additional personnel without assurance of stable funding. Specific concerns include worries about ensuring adequate surge capacity for medical response, the ability to attain adequate epidemiology staff to investigate disease outbreaks, and assuring an adequate supply of trained laboratory personnel.

Inadequate supply of a skilled laboratory workforce is of concern in the context of both bioterrorism and chemical terrorism. More than half of the directors of the 50 state public health laboratories reported that during the anthrax response staff overtime burdens were "extreme."[55] Public health laboratory directors report that workforce shortages also affect chemical terrorism readiness, saying, "there is ... no reserve workforce available to help states cope with chemical testing in the aftermath of a terrorist attack."[56]

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[52] CDC Infrastructure Status Report.

[53] Kristine Gebbie, Jaqueline Merrill, and Hugh H. Tilson, The Public Health Workforce, *Health Affairs*, v. 21, no. 6, Nov./Dec. 2002.

[54] U.S. General Accounting Office, *Major Management Challenges and Program Risks: Department of Health and Human Services,* GAO-03-101, Jan. 2003.

[55] Association of Public Health Laboratories, *Public Health Laboratory Issues in Brief — Bioterrorism Capacity*, Oct. 2002, visited at [http://www.aphl.org/docs/BTIssuebrief1.pdf].

[56] Association of Public Health Laboratories, *Ready or Not ... Findings and Recommendations of the APHL Chemical Terrorism Project,* July 2003, p. 2, at [http://www.aphl.org]

In addition to problems with hiring and retaining adequately trained workers, public health agencies and laboratories have had trouble training workers as new challenges arise. Barriers to training include rural isolation for many local public health workers, travel limitations, inadequately coordinated training efforts, overworked staff unable to leave work for professional development, and lack of funding for training.

Finally, many worry about how to be sure that the increased funding devoted to increasing public health capacity yields results in improved preparedness and response capability.

Conclusion

The events of fall 2001 have heightened concern about the nation's ability to respond to bioterrorist attacks. The strength of the public health infrastructure at the federal, state, and local level is an important determinant of the speed and effectiveness with which a response occurs and, therefore, of the severity of the consequences in terms of number of people affected. Recent Congressional action has provided funding and guidance to improve public health capacity at the federal, state, and local level. As Congress grapples with future funding decisions, continued interest in how public health agencies are using increased funding to improve capacity is expected.

Appendix: Focus Areas, Critical Benchmarks and Priority Areas for the CDC and HRSA Public Health and Hospital Preparedness Grants in FY2002 and FY2003.

Focus or Priority Area	Critical Benchmarks, FY2002	Critical Benchmarks (CDC) or Priority Areas (HRSA), FY2003
CDC Public Health Preparedness Program		
CDC Focus Area A: Preparedness Planning and Readiness Assessment	1. Designate a Senior Public Health Official within the State health department, to serve as Executive Director of the State Bioterrorism Preparedness and Response Program. 2. Establish an advisory committee with members from a variety of health agencies and first responders. 3. Prepare a timeline for the development of a statewide plan for preparedness and response for a bioterrorist event, infectious disease outbreak, or other public health emergency. 4. Prepare a timeline for the assessment of statutes, regulations, and ordinances within the state and local public health jurisdictions regarding emergency public health measures. 5. Prepare a timeline for the development of a statewide plan for responding to incidents of bioterrorism. 6. Prepare a timeline for the development of regional plans to respond to bioterrorism. 7. Develop an interim plan to receive and manage items from the National Pharmaceutical Stockpile, including mass distribution of antibiotics, vaccines and medical material.	1. Develop and maintain a financial accounting system, tracking expenditures by focus area, critical capacity, and funds provided to local health agencies. 2. Develop or enhance *scalable* plans that support local, statewide and regional response to incidents of bioterrorism, catastrophic infectious disease, such as pandemic influenza, other infectious disease outbreaks, and other public health threats and emergencies. 3. Maintain a system for 24/7 notification or activation of the public health emergency response system. 4. Exercise all plans annually to demonstrate proficiency in responding to bioterrorism, other infectious disease outbreaks, and other public health threats and emergencies. 5. Review and comment on documents regarding the National Incident Management System, and maintain a description of roles and responsibilities of public health departments, hospitals and other healthcare entities in the statewide Incident Management System. 6. Develop or maintain a Strategic National Stockpile preparedness program.

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	8. Prepare a time line for developing a system to receive and evaluate urgent disease reports from all parts of the state (or city) and local public health jurisdictions on a 24-hour per day, seven days per week basis.	
CDC Focus Area B: Surveillance and Epidemiology Capacity	9. Assess current epidemiologic capacity and prepare a timeline for providing at least one epidemiologist for each metropolitan area with a population greater than 500,000.	7. Develop/maintain a system to receive and evaluate urgent disease reports on a 24/7 basis. 8. Maintain a list of physicians and other providers with experience in the diagnosis and treatment of infectious, chemical or radiological conditions (including psychological and behavioral) that may result from terrorism. 9. Establish a secure, Web-based disease reporting and notification system. 10. Assess, at least annually, the 24/7 capacity to respond to urgent reports of outbreaks and other public health emergencies. 11. Assess, at least annually, the adequacy of public health response to catastrophic diseases (e.g., pandemic influenza), outbreaks, and other public health emergencies.

Focus or Priority Area	Critical Benchmarks, FY2002	Critical Benchmarks (CDC) or Priority Areas (HRSA), FY2003
CDC Focus Area C: Laboratory Capacity — Biological Agents	10. Develop a plan to improve working relationships and communication between Level A (clinical) laboratories and Level B/C laboratories, (i.e., Laboratory Response Network laboratories) as well as other public health officials.	12. Implement an integrated response plan for public health, hospital-based, food-testing, veterinary and environmental laboratories during a public health emergency. 13. Ensure that capacity exists for LRN-validated testing as methods are approved. 14. Conduct at least one exercise annually that specifically tests laboratory readiness.
CDC Focus Area D: Laboratory Capacity — Chemical Agents	(Focus Area D was not funded for all states in FY2002. Only those states previously funded, CA, MI, NY, NM and VA, continued to receive funding for laboratory readiness for chemical terrorism.)	(States can choose to meet one of three levels of preparedness, noted below.) 15. (Level-One) Hire and train a chemical terrorism laboratory coordinator and assistant coordinator. 16. (Level-Two) Participate in at least one exercise annually that specifically tests chemical terrorism laboratory readiness to identify at least one chemical threat agent. 17. (Level-Three) Participate in at least one exercise annually that specifically tests chemical terrorism laboratory readiness to detect at least two chemical threat agents. (Five states were previously funded at Level-Three: CA, MI, NM, NY and VA.)
CDC Focus Area E: Health Alert Network/ Communications and Information Technology	11. Prepare a timeline for a plan that ensures that 90% of the population is covered by the Health Alert Network (HAN). 12. Prepare a timeline for the development of a communications system that provides a 24/7 flow of critical health information among hospital emergency	18. Implement a plan for integrating key public health response stakeholders including a 24/7 flow of critical health information. 19. Ensure that at least 90% of key stakeholders involved in a public health response can receive and send critical information.

Focus or Priority Area	Critical Benchmarks, FY2002	Critical Benchmarks (CDC) or Priority Areas (HRSA), FY2003
	departments, state and local health officials, and law enforcement officials.	20. Routinely assess the timeliness and completeness of redundant means of communication for responders. 21. Ensure that the technical infrastructure exists to exchange a variety of data types. 22. Adopt the Logical Observation Identifiers Names and Codes (LOINC) as the standard codes for electronic data exchange between laboratories in health departments, hospitals, and others.
CDC Focus Area F: Risk Communication and Health Information Dissemination (Public Information and Communication)	13. Develop an interim plan for risk communication and information dissemination to educate the public regarding exposure risks and effective public response.	23. Implement a plan for crisis and emergency risk communication. 24. Conduct trainings, drills and exercises using the communications system.
CDC Focus Area G: Education and Training	14. Prepare a timeline to assess training needs — with special emphasis on emergency department personnel, infectious disease specialists, public health staff, and other health care providers.	25. Initiate a one-year training plan for the state and local public health workforce, healthcare professionals and laboratorians, across all Focus Areas.
HRSA Hospital Preparedness Program		
(HRSA guidance for FY2003 uses *Priority Areas*, while FY2002 guidance included three *Critical Benchmarks*.)	15. Designate a Coordinator for Bioterrorism Hospital Preparedness Planning. 16. Establish a Hospital Preparedness Planning Committee to provide guidance, direction and oversight to the state health department in planning for bioterrorism response. 17. Devise a plan for a potential epidemic in each state or region. Recognizing that many of these patients may come from rural areas served by centers in metropolitan	

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	areas, planning must include the surrounding counties likely to impact the resources of these cities.	
HRSA Priority Area #1: Governance and Administration	(Not applicable. Priority Areas were instituted in FY2003 guidance.)	#1: Develop and maintain a financial accounting system capable of tracking expenditures by priority area, by critical benchmark, and by funds allocated to hospitals and other health care entities.
HRSA Priority Area #2: Regional Surge Capacity Plan		#2-1: Establish a system that allows the triage, treatment and disposition of 500 adult and pediatric patients per 1,000,000 population (or no fewer than 500 patients per awardee jurisdiction). #2-2: Upgrade or maintain airborne infectious disease isolation capacity to have at least one negative pressure, HEPA-filtered isolation facility per awardee. #2-3: Establish a response system that allows the immediate deployment of 250 or more additional patient care personnel per 1,000,000 population in urban areas, and 125 or more additional patient care personnel per 1,000,000 of population in rural areas, that would meaningfully increase hospital patient care surge capacity. #2-4: Develop a system that allows the credentialing and supervision of clinicians not normally working in facilities responding to a terrorist incident. #2-5: Establish local or regional systems whereby pharmacies based in hospitals or otherwise participating in the local or regional health care response plan have surge capacity to provide pertinent pharmaceuticals in response to bioterrorism or other public health emergencies. #2-6: Ensure adequate personal protective equipment (PPE) to protect 250 or more health care personnel per 1,000,000 population in urban areas, and 125 or more

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		health care personnel per 1,000,000 population in rural areas, during a biological, chemical or radiological incident. #2-7: Ensure that adequate portable or fixed decontamination systems exist for managing 500 adult and pediatric patients and health care workers per 1,000,000 population, who have been exposed to biological, chemical or radiological agents.
HRSA Priority Area #3: Emergency Medical Services		#3: Develop a mutual aid plan for upgrading and deploying EMS units in jurisdictions they do not normally cover, in response to a mass casualty incident due to terrorism.
HRSA Priority Area #4: Linkages to Public Health Departments		#4-1: Implement a hospital laboratory program that is coordinated with currently funded CDC laboratory capacity efforts, and which provides rapid and effective hospital laboratory services responding to terrorism and other public health emergencies. #4-2: Enhance the capability of rural and urban hospitals, clinics, emergency medical services systems and poison control centers to report syndromic and diagnostic data that is suggestive of terrorism to their associated local and state health departments on a 24-hour-a-day, seven-day-a-week basis.
HRSA Priority Area #5: Education and Preparedness Training		#5: For awardees choosing to fund this section, develop education and training programs for adult and pediatric hospital, outpatient and pre-hospital health care professionals responding to a terrorist incident.

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HRSA Priority Area #6: Terrorism Preparedness Exercises		#6: As part of a written evaluation strategy of the awardee's program, conduct at least one bioterrorism disaster exercise in the jurisdiction during FY2003 that covers a large-scale epidemic scenario affecting both adults and children.
CDC/HRSA Cross-Cutting Benchmarks		
Cross-Cutting Benchmark #1: Incident Management	(Not Applicable. Cross-Cutting Benchmarks were instituted in FY2003 guidance)	Describe the roles and responsibilities of public health departments and the hospital community (including their supporting health care systems) related to incident management at the state and regional levels — including inter-state as well as intra-state regions, as appropriate. Review and comment National Incident Management System draft documents, other activities.
Cross-Cutting Benchmark #2: Joint Advisory Committee for CDC and HRSA Cooperative Agreements		Describe the activities of the advisory committees for the CDC and HRSA cooperative agreements during the FY 2002 budget period. Establish an Advisory Committee to assist the jurisdiction's senior public health official in overseeing both the CDC and HRSA cooperative agreements. (Required representation on the committee is specified.)
Cross-Cutting Benchmark #3: Laboratory Connectivity		Establish relationships among the various analytical laboratories in the jurisdiction (and other jurisdictions as appropriate) that are relevant to preparedness for and response to bioterrorism and other public health emergencies. Complete an inventory of analytical laboratories and of existing cooperative agreements among them.

Focus or Priority Area	Critical Benchmarks, FY2002	Critical Benchmarks (CDC) or Priority Areas (HRSA), FY2003
Cross-Cutting Benchmark #4: Laboratory Data Standard		Adopt the Logical Observation Identifiers Names and Codes (LOINC) as the standard codes for electronic data exchange between laboratories in health departments, hospitals, and others.
Cross-Cutting Benchmark #5: Jointly-Funded Health Department/ Hospital Activities		Develop and maintain a database displaying activities funded jointly by the CDC and HRSA cooperative agreements and, as applicable, other sources.